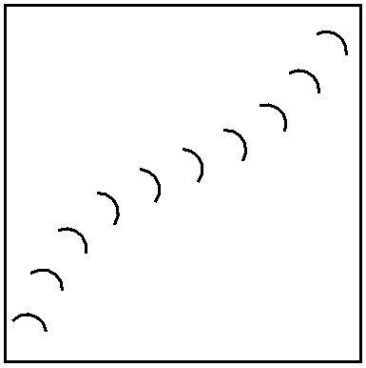
SC-1 DIKES AND BERMS

Refer to: ITD Standards and Specifications for Highway Construction, Section 212
ITD Standard Drawings P-1-E & P-1-G



Standard Symbol

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☒ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

A temporary dike or berm is a ridge constructed of compacted soil, composted material, loose gravel, stone, crushed rock, sandbags, gravel bag barriers, or straw bales that intercepts and prevents runoff from entering a disturbed area, and diverts or directs the water to a controlled or stabilized drainage outlet. Dikes or berms can be located or placed immediately along cut or fill slopes, along the perimeter of a disturbed area or adjacent to streams to prevent water from a construction site entering a body of water, or high stream flows from entering the site.

Dikes or berms can also be used to direct water to slope drains, ditches, channels, sediment basins, or sediment traps.

Appropriate Applications

- Prevent runoff from entering or overflowing onto newly-constructed slopes, or intercept or divert runoff coming off the slope.
- Intercept runoff from upland undisturbed areas, and divert or direct runoff to a sediment basin or specified location.
- Intercept runoff and sediment from exposed disturbed areas, such as a newly-constructed road or slope, and filter sediment or redirect water to a slope drain, sediment basin, or other specified location.
- Install a perimeter around a disturbed area to protect adjacent undisturbed areas and prevent off-site runoff from entering the area.
- Still the water in larger sediment basins, allowing more sediment to settle.

- Prevent or reduce soil and wind erosion on newly-constructed slopes or disturbed areas.
- Prevent high water from streams, ponds, or lakes from entering a project.
- Prevent runoff from entering into bodies of water.
- Slow down the velocity of water with a waterbar in ditches.
- Divert runoff from roadway under construction with a waterbar to a roadside ditch.

Limitations

- Do not use dikes and berms in streams or channels.
- Some dikes and berms can be used to filter water, but dikes should not be used in active streambeds.
- Space, degree of slope, and access can be limiting or prohibitive factors for installing a dike or berm.
- Compost berms can be used in place of silt fence in areas with low to moderate runoff flows, in or near wetland or sensitive areas, as well as hard-to-access areas. Compost berms should not be used in areas with high concentrated surface runoff or high velocity flows such as ditches, channels, or streams.
- The dike or berm must be designed and constructed to avoid causing erosion or washout due to diverting the water and creating concentrated flow of high velocity runoff.
- Most dikes or berms should be used for anticipated minor runoff or small drainage areas and must be properly keyed and compacted to avoid washout.
- Sandbags or gravel bag barriers can usually be used to construct dikes or berms in more restricted or hard-to-access areas.
- Straw bale sediment barriers are to be used in emergencies only and require constant maintenance and repair. Straw bales, properly installed and anchored, can be placed uphill of a silt fence to act as a sediment barrier prior to water passing through a silt fence.

Design Parameters

- If soil is used for dikes or berms, the soil should consist of silt or clay intermixed with gravel or rock.
- The height of dikes or berms comprised of soil or rock should be sufficient to prevent water from overtopping the structure. For slopes 2H:1V or flatter, the width at the top of the dike or berm should be approximately twice the height. Maximum height should not exceed 5 feet.
- A compost dike or berm should be constructed with a minimum of 1.5-feet high by 3-feet wide for maximum water filtration ability and steeper slopes. Compost dikes or berms may also be left as a permanent filter or part of the natural landscape and may include a permanent seed mix to provide a natural project appearance.

- Geosynthetic liners should be placed on the uphill or upstream side and properly anchored to prevent erosion or washout of the dike or berm.
- If used as an interceptor/diversion structure, the berm should be built on the contour with a consistent and gradual gradient to a stabilized outlet.
- A channel or ditch may be constructed directly uphill from a dike or berm to aid in diverting and carrying water to a stabilized outlet.

Construction Guidelines

- Dikes and berms shall be graded in order to detour runoff to a stabilized outlet or other area using a gradient as flat as possible to prevent erosion.
- Compaction of the dike or berm material (if soil or rock) is required. If for any reason the compaction cannot be done, geosynthetic liners shall be used to avoid erosion and washout.
- Sandbags shall be stacked in an interlocking fashion to prevent water from flowing under or between bags.
- Straw bales shall be installed in a trench and anchored properly. The straw bales shall be laid on the sides opposite the bale twine, and any holes or gaps shall be plugged tightly with wedged straw. A geosynthetic liner, properly anchored, shall be used to increase the effectiveness of the straw bale dike or berm.
- Field adjustments shall be made as necessary to ensure proper performance.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Remove sediments retained by the filter berm once it has reached one-half of the exposed height of the berm, and dispose of properly to an approved site. Remove channel or ditch obstructions and dispose in an approved location.
- Remove the dikes or berms only after other permanent BMPs are in place and the site is stabilized. Sometimes the dike or berm may be left in place and continue operating after final acceptance of the project, or the maintenance section for that area may be required to remove the dikes or berms at a later date.
- If straw bales are used, check for failure, damaged bales, undercutting or end runs. Replace or repair as necessary.
- Straw bales shall be removed from the site after permanent BMPs are in place and the site is stabilized. Dispose of in an approved manner.